DOUBLE STACKED TRUCKS FOR SKATEBOARDS

Description

Background of the Invention

Field of the Invention

The present invention generally relates to skateboards with improved maneuverability, and in particular to a skateboard with double trucks, which are in a stacked array, for increased turning ability, shock absorption, flexibility, control and traction.

Description of the Prior Art

The sport of skateboarding has exploded in popularity in recent years. The competitive sport of skateboarding includes many different styles of competition. For example, trick riding, slalom, downhill, etc., are just some of the variations that have recently developed. The more serious skateboarding pursuits subject skateboards to exacting performance characteristics. The most functional performance characteristics are controlled by the truck or chassis of the board. The truck controls the stability, maneuverability, and handling of the board. Each of the modes of skateboarding requires a different truck performance for optimum skateboard performance.

The prior art construction of skateboard truck chassis are exemplified, for example, by U.S. Pat. No. 3,862,763, issued Jan. 28, 1975, to Gordon K. Ware. The prior art skateboard truck assembly typically employ an arrangement wherein the pivot axis is approximately 45 degrees with the weight of the board supported predominantly on tension pads, which are oriented substantially vertically or at most a few degrees up to approximately 15 degrees off the vertical, such as illustrated in the Ware patent. The

arrangement is such that the tension in the pads can be adjusted by adjustment of the tension bolt and this can provide minor adjustments in the pivot axis of the truck assembly. However, there is no independent adjustment of the pivot axis independently of the adjustment of the tension in the tension pad. Moreover, with this arrangement, the tilting of the board with respect to the chassis, which results in the major control and steering of the board is resisted predominantly by the pads. The tilt is also at substantially right angles to the axis of the tension bolt, resulting in high stress on the tension bolt.

Conventional trucks follow a basic design in which an axle pivots about an arm attached at one end to the center portion of the axle. The other end of this pivot arm is loosely fitted, at an angle of approximately 45 degrees, into a plastic cup mounted in a baseplate, thus forming a ball-like joint. A pair of doughnut-shaped grommets, usually made of rubber or urethane plastic of various hardnesses, is mounted on a substantially vertical kingpin fixed in the baseplate on the side of the axle opposite the plastic cup. These grommets grasp a ring extending from the axle body so that the axle is suspended between the ball-like joint and the grommets.

By adjusting the kingpin, the tension on the grommets may be increased or decreased, thereby varying the balance between turning stability and turning ease. The kingpin employed in conventional trucks is oriented at a substantially right angle to the tilting movement of the deck, resulting in high stress on the kingpin. Because the kingpin and the grommets do not adequately stabilize the pivot arm axis, and because of the loose fit between the pivot arm and the plastic cup, the angle of the pivot axis tends to

deteriorate as the axle tilts, so that very tight turns may be difficult or impossible to achieve.

A further drawback of this standard design is that the suspension system formed by the plastic grommets fails to provide fine steering control. Riders control the angle of the deck's tilt, and thus the size of the turns they make, by varying the distance by which they shift their weight laterally across the width of the deck. Regardless of their hardness or of how they are adjusted, the standard urethane grommets do not offer a regular, orderly pattern of resistance to such weight shifts. The result is that the riders cannot easily predict or measure how far they must shift their weight to achieve steering radii of various sizes.

Typically a truck is mounted near each end of the skateboard, and includes a pair of wheels at each end of its axles. In such assemblies, the truck normally positions the angle of turning of the axles and wheels at a 45 degree angle to the board. Accordingly, tilting movement of the board causes a turning moment to the axle and thus the wheels. The trucks provide steering response when a skateboarder shifts his or her weight laterally across the board, whereby the axle twists, causing the board to turn. The trucks also serve, by means of a suspension system, commonly urethane bushings, to resiliently resist the skater's lateral tilt of the deck, thus stabilizing the board, and returning it to its normal position when the turn is completed.

The general object of the skateboard suspension system is to provide ride smoothness, general board stability, and turning ability, through a relatively inexpensive, standardized truck assembly. The standardized truck assemblies are normally

standardized at the angle of axle pivot of 45 degrees. This provides medium turning ability with compromised instability at relatively high speeds.

Wider turning ability can be achieved by loosening the kingpin, which results in less control and less responsiveness for performing various desired maneuvers. The prior art has not adequately addressed the problem of providing wider turns and sharper turns while maintaining firm control with a tight responsive truck.

Prior art U.S. Patent Application #20020125670, published 9/12/2002 by Stratton, puts forth a skateboard truck that provides a combination of adjustable lateral stability and enhanced turning abilities. The skateboard truck comprises a base attachable to the underside of a skateboard and an arm carried by the base and rotatable relative to the base about a first axis. The skateboard truck has an axle with a pair of wheels mounted at opposite ends thereof is carried by the arm and the axle is rotatable relative to the arm about a second axis. A spring-loaded linkage is operatively connected between the base and the arm for limiting the rotational motion of the arm and biasing the arm towards a center position aligned with the skateboard's direction of movement. The first and second axes provide pivoting of the skateboard in two dimensions.

Prior art U.S. Patent #5,853,182, issued 12/29/1998 to Finkle, provides a truck assembly with skateboards where the axle assembly is supported on an elastomeric bumper, which in turn is supported on an angled shaft. As the skateboard is tilted, the bumper is twisted, causing the axle of the skate assembly to tilt and turn. The bumper is held at one end to the base and at the other end to the axle assembly.

Prior art U.S. Patent #6,206,390, issued 3/27/2001 to Borg, shows a skateboard apparatus for higher turning capabilities. The skateboard apparatus includes a board for supporting a user. The board has a top surface, a bottom surface, a front end and a back end. A first wheel assembly is coupled to the bottom surface of the board. The first wheel assembly is positioned generally nearer the back end than the front end. A second wheel assembly is coupled to the bottom surface of the board and is positioned generally nearer the front end than the back end of the board. The second wheel assembly generally comprises an axle and a pair of wheels. The axle is adapted to rotate with respect to a longitudinal axis of the board. A steering assembly is used for altering the rotational direction of the wheels of the second wheel assembly. The steering assembly has a first end coupled to the second wheel assembly. The steering assembly extends away from the second wheel assembly such that a user may grasp a free end of the steering assembly.

Prior art U.S. Patent #4,060,253, issued 11/29/1977 to Oldendorf, claims a method and apparatus for a skateboard suspension system. Angle pads are removably sandwiched between the truck assemblies and boards of skateboards. The pads have upper and lower surfaces with different interface angles with the respective truck assemblies and boards, that increase or decrease the pivot angle of the truck assemblies relative to the boards and thus selectively change the amount of board tilt required to provide a desired turning of the axles and wheels through the truck assemblies. Thus the angle pads allow selective changing of the magnitude of turning of either the front or rear truck assemblies and wheels to achieve exceptional turning ability or high speed stability.

Prior art U.S. Patent #5,263,725, issued 11/23/1993 to Gesmer, describes an improved skateboard truck that incorporates exceptionally rapid and consistently accurate axle rebound to the straight-ahead position, consistent and predictable steering response, an improved balance between stability and maneuverability, fine steering control, and a wide range of steering radii. A yoke containing the truck axle includes a central body portion with a central aperture therein for a pivot pin. Sockets for containing the ends of coil springs are formed in the yoke on either side of the yoke's central aperture. A baseplate includes a second aperture for receiving the end of the pivot pin, and the pivot pin itself extends through the yoke into the baseplate. Second sockets for receiving the other ends of the coil springs are also formed in the baseplate on either side of the second aperture, and the coil springs themselves extend from the sockets in the yoke to the sockets in the baseplate. The sockets are conically shaped. As the yoke turns, pivoting the wheels on the outer ends of the yoke in a very fixed arc about the pivot pin, the coil springs remain substantially columnar and unbuckling as they pivot at each of their ends in the sockets' bases.

Prior art U.S. Patent #5,997,018, issued 12/7/1999 to Lee, discloses an all-terrain sport board especially adapted for riding on rough out-door terrain employing large pneumatic wheels, a large frame and a spring steering mechanism that enables a rider to tip the board and turn the wheels to a much greater degree than would be possible with a conventional boards. The steering mechanism provides polymeric shock absorbers of varying configurations to enhance the ability of the rider to make athletic maneuvers and jumps with the board without undue turbulence in the ride.

Prior art U.S. Patent #4,645,223, issued 2/24/1987 to Grossman, indicates a skateboard assembly that has greatly improved riding and handling characteristics. The assembly includes a skateboard, a plurality of spaced wheel axles and rotatably secured sets of wheels and elongated resilient suspension frames connected at their opposite ends through housings to the wheel axles and to the underside of the skateboard. The assembly has at least four different shock-absorbing systems. Thus, the frames themselves absorb shock, as do cylinders of resilient rubber or the like set in cups connected to the frames above the wheel axles and bearing against the underside of the board. The wheel axle housings also include resilient dampeners, which adjustably restrict steering rotation of the wheel axles and additionally dampen shocks. The frame housing connected to the underside of the skateboard rotatably receives the bases of the frames and adjustably controls that rotation, while providing a shock absorbing function, through the use of resilient bushing around the frame bases. The bushings are adjustably compressible thereagainst by adjustably tightening the frame housing against the underside of the skateboard. The assembly is simple, inexpensive, durable and efficient, imparting greatly improved riding and handling characteristics to the skateboard.

Prior art U.S. Patent #5,522,620, issued 6/4/1996 to Pracas, puts forth a skateboard truck for a skateboard that has a pivotal member, which is connected to the deck of the skateboard. The pivotal member carries the wheel assembly of the truck. A locking mechanism is also provided. In a first (unlocked) mode of operation, the pivotal member is able to pivot so that the truck is movable in a to and fro manner. This first mode of operation permits a rider to perform advanced maneuvers using a skateboard. In

a second (locked) mode of operation, the truck is locked against such to and fro movement by the locking mechanism.

Prior art U.S. Patent #6,547,262, issued 4/15/2003 to Yamada, concerns an improved truck assembly for skateboards and street luges, which provides speed and fast reaction maneuverability. The preferred skateboard truck comprises a yoke mounted by a king bolt to a mounting base. The mounting base comprises a socket hub and a bracket. The yoke comprises a hanger and a pivot arm. The pivot arm rotates freely in a bearing unit supporting the pivot arm in the socket hub. The king bolt clamps the hanger with a first grommet and a second grommet. The first grommet is flexible, preferably made of urethane rubber, and comprises an edge circumference and a center circumference. The center circumference is narrower than the edge circumference. Preferably, the first and second grommets are fluorescent.

Prior art U.S. Patent #6,182,987, issued 2/6/2001 to Bryant, illustrates an improved skate or skateboard, which incorporates precision steering and rocking components for consistency and accuracy during maneuvers and a method for removing or replacing worn or broken axles. A yoke containing the truck axle includes a central body portion into which a precision ball socket has been machined. It is jointed by a spherical component for the yoke to pivot around. It is also fitted with a precision ball pivot pin opposite the socket, which will act as the associate pivotal and rocking mechanism for the truck assembly. The base is comprised of a central body into which a stud is secured for mounting the yoke and a pocket has been machined for containing a precision ball socket to accept the associate ball pivot pin. A slotted configuration

situated at each end of the yoke can be compressed with screws to allow the axle to be removed or replaced.

Prior art U.S. Patent #6,224,076, issued 5/1/2001 to Kent, is for a pneumatic compression strut skateboard truck, which is intended for use in street and off-road skateboarding. The truck utilizes a pneumatic compression strut suspension system, which is of the same type and kind used in automobiles and other mechanical devises employing shock absorbing technology. The compression struts resist pressure in the direction of their length, thereby decreasing or eliminating shock forces associated with street and off-road skateboarding. By reducing or eliminating these extreme forces, the skateboarder has more maneuverability and control. Further, it reduces or eliminates the shock forces that would normally be transferred to the skateboarder. This will contribute to the decrease in stress and fatigue of the skateboarder's extremities and therefore increase endurance.

Prior art U.S. Patent #4,194,752, issued 3/25/1980 to Tilch, provides a skateboard that comprises an elongated board and a pair of trucks mounted adjacent opposite ends of the board, each truck has a pair of rotatable wheels. Each truck consists of a tensile elastic suspension member and a pivot support consisting of a universally movable ball and socket joint. The novel features of construction and arrangement of the skateboard assembly provide improved steering action of the axles relative to the board, wherein the energy for steering and accelerating the skateboard is substantially reduced.

Prior art U.S. Patent #4,109,925, issued 8/29/78 to Williams et al., describes a skateboard truck including an axle assembly which is quickly detachable from the truck

mounting pad by means of a tension bolt fitting within a slotted bracket in the mounting pad for quick detachment therefrom. The skateboard truck assembly is provided with a tension screw assembly that is mounted at a less than 45 degree angle with respect to the skateboard and includes adjusting means for adjusting the pivot axis of the assembly with respect to the skateboard, totally independent of the adjustment of the tension in the assembly. A safety bracket includes a base portion with an arm having a cylindrical bore for receiving the cylindrical outer end of the tension bolt for reducing the stress on the board or tension bolt during the steering of the skateboard.

It is therefore advantageous to have a new and improved skateboard suspension system, in which high speed stability can be achieved along with exceptional turning ability providing wider turns and sharper turns while maintaining firm control with a tight responsive truck.

Summary of the Invention

An object of the present invention is to provide a new and improved double stacked truck skateboard suspension system, in which high speed stability can be achieved along with exceptional turning ability providing wider turns and sharper turns while maintaining firm control with a tight responsive truck.

Another object of the present invention is to provide a double stacked truck skateboard suspension system with two kingpins and two sets of grommets stacked on top of each other to effectively double the turning capability while maintaining the desired tension in each of the kingpins for optimum control and performance characteristics.

One more object of the present invention is to provide a double stacked truck skateboard suspension system that may have first and second trucks with similarly angled kingpins, wherein both trucks are regular type or both trucks are Randal type trucks.

An additional object of the present invention is to provide a double stacked truck skateboard suspension system that may have first and second trucks with differently angled kingpins, wherein the first truck is a regular type truck and the second truck is a Randal type truck or the first truck is a Randal type truck and the second truck is a regular type truck.

A further object of the present invention is to provide a new and improved double stacked truck skateboard suspension system that has a novel pivot pin built into the top of the second truck kingpin, which engages a receiving recess in the face of the base plate.

In brief, a pair of pivoting trucks are stacked on top of each other, preferably welded together, with the topmost truck having the axle portion removed to reduce the overall height of the double stacked truck. The trucks may be two regular (independent brand type) trucks welded together and mounted on a plate on the bottom of the board. There is also an alternate type truck called a "Randal" truck used by high end skaters and long boarders and has different handling and turning capabilities. The Randal truck can be stacked onto a regular truck base or two Randals stacked together or a regular stacked on a Randal as desired for different performance characteristics.

The difference between the two types of trucks is in angle of the kingpin bolt. Randal trucks have the kingpin starting on the outside edge of the board and angled sharply (towards the two ends) and the regular truck has the kingpin located to the inside

of the axles with the kingpin in a vertical orientation. Randal trucks make the axle twist in a horizontal fashion and the regular trucks cause the deck to tilt more. Randals trucks were developed to help control speed wobbles. The kingpin of the second truck may further comprise a novel pivot end, which is insertable in the face of the base plate.

An advantage of the present invention is that it provides increased turning ability and greater maneuverability.

An additional advantage of the present invention is that it provides better shock absorption.

One more advantage of the present invention is that it provides increased flexibility.

Yet another advantage of the present invention is that it provides increased control and traction.

Another advantage of the present invention is that it can use standard or Randal trucks.

Still another advantage of the present invention is that it is inexpensive to manufacture.

Brief Description of the Drawings

These and other details of my invention will be described in connection with the accompanying drawings, which are furnished only by way of illustration and not in limitation of the invention, and in which drawings:

FIG. 1 is a perspective view of a first regular type truck mounted on a base plate under a skateboard, the first truck having no axle and a second regular type truck mounted on the first truck;

FIG. 2 is a perspective view of a first regular type truck mounted on a base plate under a skateboard, the first truck having no axle and no pivot pin and a second regular type truck mounted on the first truck with the kingpin of the second truck having a top pivot pin inserted in the base plate;

FIG. 3 is a perspective view of a first regular type truck mounted on a base plate under a skateboard, the first truck having no axle and a second Randal type truck mounted on the first truck.

Best Mode for Carrying Out the Invention

In FIGS. 1-3, a double stacked truck system 20 or 20A for skateboards that comprises a first truck 22A, which is attached to a base plate 25 mounted on an underside of a skateboard 30 at each end of the skateboard. The first truck 22A comprises an adjustable kingpin 23A and grommet configuration 21A and is reduced in height by having no axle. The double stacked truck system 20 or 20A also comprises a second truck 22B that is attached to the first truck 22A, preferably by a welded joint 29 or other means to join the two trucks 22A and 22B together. The second truck 22B comprises an adjustable kingpin 23B and grommet configuration 21B and an axle 41 and pair of wheels 40 so that the first and second truck 22A and 22B combine to create a stacked truck 20 or 20A having two cooperative kingpin 23A and 23B and grommet configurations 21A and 21B for a single axle 41 and pair of wheels 40, thereby doubling

the turning and maneuvering capability of the skateboard. The kingpin 23B of the second truck 22B may further comprise a pivot end 27, which is insertable in the face 26 of the base plate 25, as shown in FIG. 2, rather than each truck having a separate pivot pin.

The first and second trucks 22A and 22B may have similarly angled kingpins 23A and 23B, wherein both trucks 22A and 22B are regular type, as shown in FIGS. 1 and 2, or both trucks 22A and 22B are Randal type trucks (configuration not shown).

The first and second trucks 22A and 22B may alternately have differently angled kingpins 23A and 23B, wherein the first truck 22A is a regular type truck and the second truck 22B is a Randal type truck, as shown in FIG. 3, or the first truck 22A is a Randal type truck and the second truck 22B is a regular type truck (configuration not shown).

The topmost truck 22A is mounted on a base plate 25 by bolting the kingpin through an opening in one face 28 of the base plate 25, which would then be mounted on the bottom of the skateboard 30, as shown in FIGS. 1 and 2, or on a base plate 25 mounted in a recess 31 in the board 30 as shown in FIG. 3. The pivot pin 27 engages a recess in the other face 26 of the base plate.

In practice, a user may increase or decrease the tension of the grommets 21A and 21B on the trucks 22A and 22B by adjusting the kingpins 23A and 23B, thereby varying the balance between flexible maneuvering and control.

It is understood that the preceding description is given merely by way of illustration and not in limitation of the invention and that various modifications may be made thereto without departing from the spirit of the invention as claimed.